

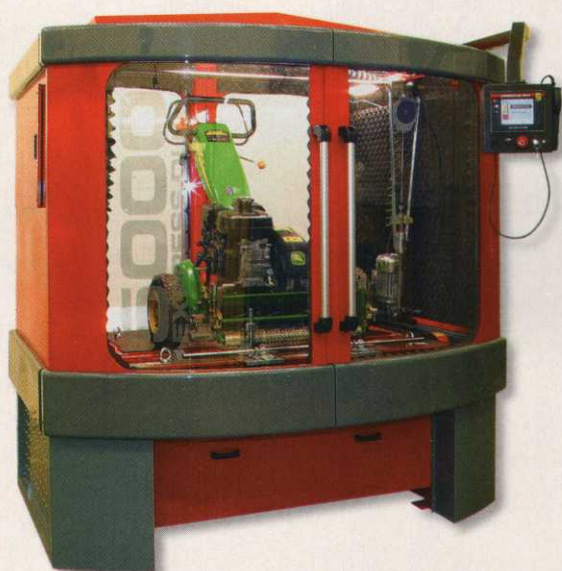
As much as I'd like to help,

I cannot remove the asphalt indentation from your precious high spin ball. For you should know that cart paths are not your intended target anymore than ancient oak trees or aluminum siding on a condominium. Bring me your dirt, leaves, mud and grass and I will restore and refurbish your gem to its original luster. But even my 50+ years of experience has not come up with any advice for that travesty you call a swing.



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Coke and Argentinosaurus

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Chow and eats:

Except for high-end dining and hotel bars, downtown tends to get a little calm after dark. So if you're looking for little jump in your jive, you may want to head to two distinctly different areas: **Buckhead**, a swanky collection of restaurants and shops; or **Little Five Points**, the place for the trendy, youthful and tragically hip.

According to Sewell, a long-time resident of the area, **McKendrick's** (505 Ashford Dunwoody Road) serves as one of Atlanta's best steakhouses. "It's a man's man's place," she says. McKendrick's serves up phenomenal cuts and humongous lobster tails, and every need is attended to by a wait staff that's second to none. It's not cheap, but it is good, and has been named one of the top 10 steakhouses in the country for the past four years. Call 770-512-8888 for reservations.

Another Atlanta steakhouse staple is **Bone's** (3130 Piedmont Road), which has been named the top steakhouse by Atlanta magazine every year since 1988. Patrons swear the lobster bisque is as good as anywhere in the country, and marvel at the service. See for yourself by making reservations at 404-237-2663.

Another place that has been getting tremendous attention lately is **2 Urban Licks** (820 Ralph McGill Blvd.), with chef Scott Serpas' fiery daily-changing menu outstanding diners nearly as much as the jaw-dropping décor. The menu features American food with a mix between Cajun flair and Southern spice. Think of Gouda grits to get the idea, or better yet, call 404-522-4622 for reservations. If more traditional fare is your bag, long-time metro resident Jay Stewart recommends you slide over to Midtown's **Veni, Vidi, Vici** (41 Fourteenth St.), a real Italian restaurant known for its excellent veal and luxurious risotto, all tucked into a stylish décor. Call 404-875-8424 for reservations.

Another spot favored by Sewell is **Sambuca Jazz Café** (3102 Piedmont) in Buckhead. This modern-day supper club features elegant food and spectacular live music seven days a week. Patrons all face the stage and all the sight lines are as good as the Mediterranean fare served up here.

Maybe you've had enough of fine dining and just want a burger. If so, check out **Vortex**, says Meredith Upchurch, a Kansas City resident who spends summers in Atlanta. The burgers, beer and single-malt scotch selection are second to none, but the service will not rank as the finest.

The Vortex doesn't take kindly to whiners or the politically correct, and, as they say, "The Vortex was not designed as a 'family restaurant.'" "We are a Bar & Grill that is meant for adults." Find the **Little Five Points** location at 438 Moreland Ave., and another in Midtown at 878 Peachtree St NE # 4.

Those who want to hit the nightlife for dancing and

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Coke and Argentinosaurus



The Omni Hotel is located at CNN center in downtown Atlanta, just across the street from Centennial Olympic Park.

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people watching should hit midtown's **Vision** (1068 Peachtree St. NE), a gigantic club that hops to its own beat. It can get crowded in each of its distinct six areas quickly, so go a little early — and secure a VIP e-mail pass by visiting www.visionatlanta.com.

If throngs and heavy bass aren't in your repertoire, Stewart offers an old-school alternative, **Blind Willie's** (828 N. Highland Ave. NE). This Virginia Highlands joint channels

the best of Memphis, New Orleans and Chicago as it presents live, raw blues every night of the week.

While it's a bit away from downtown, locals swear by the **5 Seasons Brewery** a mi-

crobrewery with dining that matches its sumptuous beers. The Brewery (5600 Roswell Road NE) features decidedly different menu items — ostrich steak and grilled pizza. Those who love suds made with great ingredients and an artisan's touch will not be disappointed.

Word to the wise

Enjoy your time in Atlanta. And even though the city is friendly, crime does occur. Be aware of your surroundings, know where you are going, keep your wits about you, and don't forget to use the concierge in the hotel. Oh, and if you were thinking about mentioning Gen. William Sherman in any context — think again. There's no better way to make residents angry than to invoke the name of the man who burned the town to the ground on Nov. 15, 1864.

Lucky for you, Georgians are a hearty bunch, and their rebuilding has been magnificent. Enjoy the show. ■

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TURFGRASS TRENDS

WINTER SURVIVAL

Effects of Fall-Applied N and K on Cold Hardiness of Perennial Ryegrass

By J. Scott Ebdon and David E. Webster

Winter kill is a non-specific term that can include several abiotic (non-living) stresses as well as biotic stresses such as low-temperature fungi. Low-temperature kill (freezing stress), ice cover and low-temperature disease are the principal agents associated with winter injuries in the Northeast. Perennial ryegrass (*Lolium perenne* L.) is planted throughout the region. Research shows that perennial ryegrass is one of the most susceptible cool-season grasses to low temperature (4, 5).

Freeze-stress injury is a function of several factors such as the species, physiological state of the plant, environmental conditions and the mechanism of injury (2).

Balanced nutrition is essential to quality turf. Nitrogen (N) is a critical nutrient in cold hardiness, and heavy applications of N in the fall period may increase freeze-stress injury. Low-temperature kill as well as low-temperature disease increase with crown hydration and tissue N.

An inverse relationship between cold hardiness and crown moisture content is often observed. The period of maximum cold hardiness in cool temperate regions occurs following acclimation (hardening) to low temperature in late December and



Direct low-temperature kill in perennial ryegrass, South Deerfield, Mass. Perennial ryegrass exhibits poor low-temperature hardiness. Freeze-stress injury in this photo was most severe in low-lying areas where free water accumulated to promote crown hydration. Photograph was taken in late March after snow had melted.

early January (1). Winter kill from low temperature most often occurs during de-hardening in late winter and early spring as plants lose their cold hardiness (see photograph).

There are numerous reports that provide different results as to the relationship between N and potassium (K) and winter hardiness. Researchers (3) reported that a N-to-K ratio of 2-to-1 provided maximum low temperature survival in

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Kentucky bluegrass (*Poa pratensis* L.) and creeping bentgrass (*Agrostis stolonifera* L.) at all levels of N applied from 0 pounds to 16 pounds per 1,000 square feet per year. Their results suggest that a balance of potassium that is one-half that of nitrogen is important for maximum cold hardiness rather than low N or high K.

In recent years there has been a practitioner trend towards applying relatively high rates of K equal to or exceeding N. Although the effects of N or K applied alone and in combination have been studied, there is no agreement among turfgrass managers as to the optimum K fertilization program. Limited information is available as to the optimum N and K rates during the fall period to achieve maximum hardiness in late winter and early spring when grasses are most susceptible to freeze stress.

The objective of this study was to evaluate perennial ryegrass low-temperature hardiness in response to fall-applied N and K during de-hardening in late winter and its effects on crown hydration, lethal-freezing temperature, shoot-growth rate, tissue K concentration and low-temperature disease.

Materials and methods

Fertilizer studies were initiated in April 2000 at the Joseph Troll Turf Research Center (South Deerfield, Mass.), University of Massachusetts Amherst.

Fifteen N-K combinations were applied to established Palmer II perennial ryegrass. Soil extractable phosphorous (P) and K prior to treatment were high, so no supplemental P or K was recommended. Treatments included five rate levels of N (1, 3, 5, 7 and 9 pounds per 1,000 square feet per year) in all combinations with three rate levels of K (1, 5 and 9 pounds per 1,000 square feet per year). The 15 N-K treatment combinations were arranged as a randomized complete block with four replicates. Plots were mown twice per week at 1.25 inch, using reel mowers. Clippings were returned except when collections were made for growth determination and tissue nutrient analysis.

Urea (45-0-0) was used as the sole N

source while potassium sulfate (0-0-50) was used as the sole source of K. Monthly N and K fertilizer applications were generally applied during the last week of each month and irrigated after fertilization. Approximately 60 percent to 70 percent of the total annual N was applied during the fall period from late August through late November. Late fall N in November was applied following the last mowing after shoot growth ceased.

Clippings were collected monthly following mowing events for a total of five collec-

Maintain WSN rates to no more than 1 pound N per 1,000 square feet per growing month during periods of active shoot growth in the fall.

tions per growing season from April through August in 2002 and 2003. Clippings were oven dried, weighed and expressed as grams (g) dry matter per square meter per day. Total tissue K was determined in 2002 and 2003 from chemical analysis of dried clippings collected in April prior to fertilizer treatments.

Plots were rated for gray snow mold (*Typhula incarnata*) as percent of plot in early spring of 2002 and 2003. Shoot growth rate, tissue K and snow mold severity are reported here averaged over 2002 and 2003 growing year.

To determine cold hardiness, plant samples were taken from field plots during late winter and early spring of 2004. Plant material was evaluated for low-temperature hardiness by exposing individual plants to a range of 11 decreasing treatment temperatures. After temperature exposure, plant material was removed and planted in the greenhouse to evaluate re-growth and survival. Plants with any new growth were counted as survivors.

The temperature at which 50 percent of the plant (crown) tissue that survived was expressed as the LT50 (lethal temperature at which 50 percent of the plant material survive). At the time of field sampling, crowns were also removed from each N-K treatment

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Bayer Environmental Science

QUICK TIP

It may seem impossible but spring is just around the corner, and *Poa annua* seedheads will soon be popping up in greens and fairways. Reduced flowering through use of plant growth regulators will gradually reduce the *Poa* seedbank in the soil and aid in *Poa* reduction. Proxy plant growth regulator provides excellent *Poa* and white clover seed-head suppression. Apply Proxy approximately 10 days before expected spring flush of *Poa* seedheads.

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plot and used to determine percent crown moisture content.

Effects of fall-applied N

Nitrogen was an important factor affecting low-temperature hardiness. Excessive N applied during periods of active shoot growth during the fall (September and October) increased the potential for low-temperature kill.

Water-soluble N (WSN) applied in September at 2 pounds N per 1,000 square feet followed by 1 pound per 1,000 square feet

in October was associated with significantly higher killing temperatures (less cold hardy) (Figure 1).

Late fall-applied N in November did not appear to increase the potential for low-temperature kill. A single application at 1 pound N per 1,000 square feet applied in September was no different in cold hardiness from other fall-applied N treatments, all of which incorporate late fall N.

When compared to 1 pound of N in September, higher crown moisture content was observed in response to N applied in September at 2 pounds per 1,000 square feet followed by 1 pound per 1,000 square feet in October (Figure 2). This increase in tissue moisture also promoted low-temperature disease (*Typhula incarnata*) (Figure 3).

Winter disease increased by as much as 25 percent over other fall-applied N treatments. Timing and rate of N are critical to the success of fall-applied N. It is better to err on the side of applying N too late than too early during the late fall period.

Secondly, it is recommended to maintain WSN rates to no more than 1 pound N per 1,000 square feet per growing month during periods of active shoot growth in the fall.

Effects of fall-applied K

The role of K in plants is complex because of its many physiological functions. Potassium's ability to bind water during the formation of ice crystals has been suggested as a possible mechanism in cold tolerance.

In our study, K had an influence on crown moisture, cold tolerance and low-temperature fungi; however, K effects were dependent on the rate of N applied during the fall period.

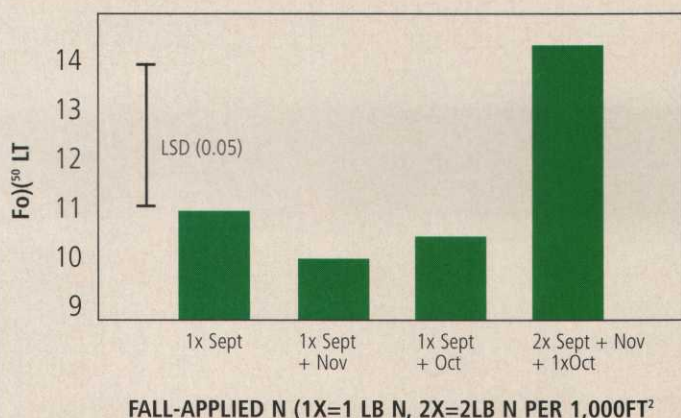
At N rates of 2 and 1 pound per 1,000 square feet applied in September and October (5 pounds of total N per 1,000 square feet during the early-to-late fall period), cold hardiness decreased and crown hydration increased with K fertilization.

At these N rates, a significant increase in the uptake of K was observed, which was commensurate with increases in the rate of shoot growth and loss in cold hardiness.

The higher tissue (and crown) moisture content promoted by K also increased gray

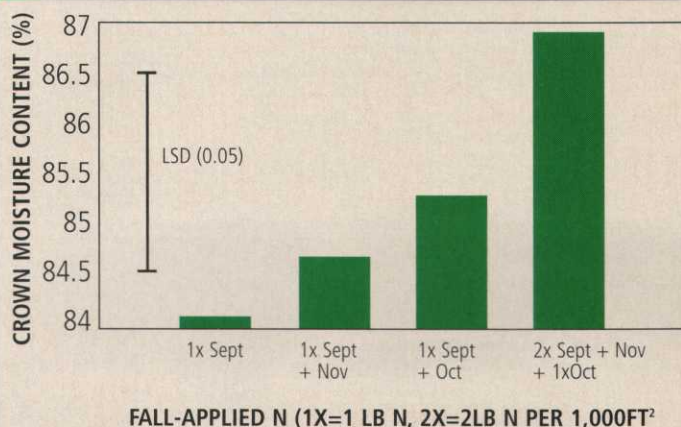
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FIGURE 1



Effects of fall-applied N on median lethal temperatures (LT 50) in perennial ryegrass during late winter.

FIGURE 2



Effects of fall-applied N on crown moisture in perennial ryegrass during late winter.